

WHAT IS CLAIMED IS:

1. A spindle of a machining center, comprising
a spindle seat equipped with a plurality of bearings therein;
5 a main spindle housing fitted to the bearings and formed with a
cone-shaped hole on an power output end thereof for allowing insertion
of a tool shank housing therein, by which tool shank housing a tool is
clamped;
a pull rod held in the main spindle housing and having a clamping
10 claw at an power output end thereof; the clamping claw being used
together with an inner concave ring of the main spindle housing for
clamping the tool shank housing; the clamping claw having a central
hole, in which a guide tube is held; and
a cam ring seat;
15 the main spindle housing having a shaft coupling, and a bearing
support at an upper end, and having a plurality of coiled springs, and a
moving spacer ring held therein; external spline keys being arranged
outside the shaft coupling for movable connection with internal spline
keys of a clutch; a spacing element being arranged between the shaft
20 coupling and a first one of the bearings of the spindle seat; the bearing
support having a bearing fitted on outer side thereof; the bearing support
being formed with a plurality of cavities therein, to which a spring, and a
push rod are fitted; first and second thrust bearings being disposed

between an edge of the push rod and an upper edge of the moving spacer ring; the first and the second thrust bearings being respectively pressed against upper and lower ends of a protrusion of a lower pull rod bolt sleeve;

5 the clutch having a plurality of cavities formed therein; a plurality of springs, and a push rod being fitted to the cavities in the clutch such that the push rod is pressed against an upper edge of the spacing element at an edge thereof, and such that the clutch is upwards biased by elastic force; a claw clutch being fitted to the bearing connected to the bearing
10 support; the clutch being formed with upper and lower engaging teeth respectively on upper and lower ends thereof such that it can be separably engaged with engaging teeth of a fixing ring, which is fixed on a top of the spindle seat, at the lower engaging teeth thereof, and such that it can be separably engaged with an engaging claw of the claw
15 clutch at the upper engaging teeth thereof;

 the pull rod having a threaded portion at an upper end thereof for connection with the lower pull rod bolt sleeve as well as an upper pull rod bolt sleeve at a same time; the upper and the lower pull rod bolt sleeves being respectively formed with engaging claws, which can
20 engage each other to prevent the upper and the lower pull rod bolt sleeves from being displaced relative to each other; the upper pull rod bolt sleeve having a protrusion, and being movably passed into the claw clutch at the protrusion thereof; the protrusion having a plurality of

equidistantly spaced insertion pins fitted on an outward side thereof, which is movably passed into plural straight elongated holes of the claw clutch, and then projected from the claw clutch; a detection ring being securely joined to outward ends of the insertion pins;

5 the claw clutch having, besides the straight elongated holes and the engaging claws, internal spline keys for movable connection with external spline keys of the upper pull rod bolt sleeve; the claw clutch having a locating ring, and a screw hole on an upper side thereof;

 the cam ring seat being securely connected to the fixing ring by
10 means of bolts, and arranged outside the clutch; the cam ring seat being formed with a plurality of sloping guide trenches therein, and having a clutch disk arranged outside it; the clutch disk being equipped with guide wheels, which are passed into the sloping guide trenches; the clutch disk being equipped with a detecting device thereon, and being faced with an
15 upper edge of the clutch at an inner edge thereof; the clutch disk having an ear protrusion, to which an output shaft of a power rod is pivoted; the power rod being pivoted to an ear protrusion, which is secured on the spindle seat, at other end thereof;

 whereby the power rod can make the clutch disk to rotate when
20 being in operation, and the clutch disk will, when rotating, be made to change position at a same time with help of the sloping guide trenches of the cam ring seat, thus making the clutch change between an upper engaging position and a lower releasing position, and the claw clutch can,

when being actuated by a power source, first change to an engaging position to cause displacement of the pull rod for the tool shank housing to be clamped, and then cause rotation of the main spindle housing for machining a work piece, and then cause release of the tool shank housing, thus allowing the pull rod to be operated with the power source instead of hydraulic mechanisms.

2. The spindle of a machining center as claimed in claim 1, wherein the claw clutch is directly connected to the power source with help of the locating ring, and the screw hole thereof.

3. The spindle of a machining center as claimed in claim 1, wherein the spindle seat has a support unit on an upper side thereof, and upper and lower detecting devices are fitted on the support unit, and face upper and lower ends of the detection ring respectively.